

Claims

- 0056 1. A barrier device for a water meter cover having a tool access opening, comprising a cap structure configured to (a) be coupled to a water meter cover, (b) cover a tool access opening in the water meter cover in a manner that provides a barrier to materials and objects passing through the tool access opening in the water meter cover, and (c) provide structure for engagement by a tool, to enable a coupled barrier device and cover to be manipulated by the tool.
- 0057 2. A barrier device as defined in claim 1, wherein the cap structure comprises a hood and a stem extending away from the hood, the stem configured to be pressed into a tool access opening in a water meter cover and to couple the barrier device to the water meter cover, and the hood being configured to cover the tool access opening in the water meter cover when the cap structure is coupled to the water meter cover.
- 0058 3. A barrier device as defined in claim 2, wherein the cap structure comprises a recess formed at least partially in the hood and configured for engagement by a tool, to enable a coupled cap structure and cover to be manipulated by the tool.
- 0059 4. A barrier device as defined in claim 3, wherein the recess includes a mouth through which a tool can be inserted into the recess and a bar extending at least partially across the mouth and oriented to be engaged by a tool which is inserted into the recess.
- 0060 5. A barrier device as defined in claim 4, wherein the bar separates the recess into a smaller portion and a larger portion, and wherein the recess is beveled from the portion of the mouth forming part of the larger portion of the recess, to provide convenient access for insertion of a tool into the larger portion of the recess.

- 0061 6. A barrier device as defined in claim 2, wherein the stem has (a) a closed end which forms a barrier to passage of materials and objects through the stem and (b) an outer wall that is closely spaced with respect to the tool access opening when the stem is pressed into the tool access opening and combines with the tool access opening to provide a barrier to passage of objects and material between the stem and the tool access opening.
- 0062 7. A barrier device as defined in claim 6, wherein the hood has a border and the configuration of the hood enables the hood to at least partially flatten against a water meter cover near the border of the hood as the cap structure is being coupled to the water meter cover, so that the border of the hood and the water meter cover combine to form a barrier to materials and objects near the border of the cap structure.
- 0063 8. A barrier device as defined in claim 7, wherein the stem includes at least one coupling portion which has a coupling position in which it is aligned with the underside of a water meter cover and resists separation of the device from a water meter cover, and wherein the stem has a flexibility that enables the coupling portion to flex as the stem is passing through a tool access opening and to be returned to the coupling position when the coupling portion has passed through the tool access opening.
- 0064 9. A barrier device as defined in claim 8, wherein the cap structure has a recess that is formed in the hood and extends at least partially into the stem, the recess configured to allow insertion of a tool for manipulating a coupled cap structure and water meter cover, and the recess extending at least partially into the stem and providing at least part of the outer wall of the stem with a flexibility that enables the coupling portion to flex as the stem is passing through a tool access opening.
- 0065 10. A barrier device for a water meter cover, comprising a one piece cap structure configured to be coupled to a water meter cover and including a hood with a border configured to at least partially flatten against a water meter cover as the one piece cap structure is being coupled to the water meter cover,

so that the border of the hood and the water meter cover combine to form a barrier to materials and objects near the border of the hood.

- 0066 11. A barrier device as defined in claim 10, wherein the border of the hood is configured to flatten against the cover over a predetermined range of positions of the hood relative to the cover and still combine with the cover to form a barrier to materials and objects near the border of the hood
- 0067 12. A barrier device as defined in claim 10, wherein the one piece cap structure includes a stem extending away from the hood, the stem configured to be pressed into an opening in a water meter cover as the cap structure is being coupled to the water meter cover.
- 0068 13. A barrier device as defined in claim 12, wherein the stem has (a) a closed end which forms a barrier to passage of materials and objects through the stem and (b) an outer wall that is closely spaced with respect to the opening in the water meter cover when the stem is pressed into the opening and combines with the opening to provide a barrier to passage of objects and material between the stem and the opening.
- 0069 14. A barrier device as defined in claim 13, wherein the stem includes at least one coupling portion that has a coupling position in which it is aligned with a part of a water meter cover and resists separation of the barrier device from a water meter cover, and wherein the stem has a flexibility that enables the coupling portion to flex as the stem is pressed into an opening in a water meter cover and to be returned to the coupling position when the coupling portion has passed through the opening in the water meter cover.
- 0070 15. A barrier device as defined in claim 12, wherein the stem includes at least one coupling portion that has a coupling position in which it is aligned with a part of a water meter cover and resists separation of the barrier device from a water meter cover, and wherein the stem has a flexibility that enables the coupling portion to flex as the stem is pressed into an opening in a water meter cover and to be returned to the coupling position when the coupling portion has passed through the opening in the water meter cover.

- 0071 16. A barrier device as defined in claim 15, wherein the border of the hood is configured to flatten against the cover over a range of positions of the hood relative to the water meter cover and still combine with the cover to form a barrier to materials and objects near the border of the hood, and wherein the flexibility of the stem and the location of the coupling portion along the stem are designed to provide a range of positions of the coupling portion relative to the cover over which the coupling portion will be in a position to resist separation of the barrier device from the cover, whereby the barrier device can be coupled with a cover whose thickness can vary over a predetermined range and the hood of the barrier device will combine with the cover to form a barrier to materials and objects near the border of the hood over that predetermined thickness range.
- 0072 17. A barrier device for a fluid system cover, the barrier device comprising a one piece structure configured to be coupled to a fluid system cover and including a hood with a border configured to at least partially flatten against a fluid system cover as the one piece structure is being coupled to the fluid system cover, so that the border of the hood and the fluid system cover combine to form a barrier to materials and objects near the border of the hood.
- 0073 18. A barrier device as defined in claim 17, wherein the border of the hood is configured to flatten against the fluid system cover over a predetermined range of positions of the hood relative to the cover and still combine with the cover to form a barrier to materials and objects near the border of the hood
- 0074 19. A barrier device as defined in claim 17, wherein the one piece structure includes a stem extending away from the hood, the stem configured to be pressed into an opening in a fluid system cover to couple the barrier device to the fluid system cover.
- 0075 20. A barrier device as defined in claim 19, wherein the stem has (a) a closed end which forms a barrier to passage of materials and objects through the stem and (b) an outer wall that is closely spaced with respect to the opening in the fluid system cover when the stem is pressed into the opening and combines

with the opening to provide a barrier to passage of objects and material between the stem and the opening.

- 0076 21. A barrier device as defined in claim 20, wherein the stem includes at least one coupling portion which has a coupling position in which it is aligned with a part of a fluid system cover and resists separation of the device from a fluid system cover, and wherein the stem has a flexibility that enables the coupling portion to flex as the stem is pressed into an opening in a fluid system cover and to be returned to the coupling position when the coupling portion has passed through the opening in the fluid system cover.
- 0077 22. A barrier device as defined in claim 19, wherein the stem includes at least one coupling portion that has a coupling position in which it is aligned with a part of a fluid system cover and resists separation of the barrier device from a fluid system cover, and wherein the stem has a flexibility that enables the coupling portion to flex as the stem is pressed into an opening in a fluid system cover and to be returned to the coupling position when the coupling portion has passed through the opening in the fluid system cover.
- 0078 23. A barrier device as defined in claim 22, wherein the border of the hood is configured to flatten against the cover over a range of positions of the hood relative to the fluid system cover and still combine with the cover to form a barrier to materials and objects near the border of the hood, and wherein the flexibility of the stem and the location of the coupling portion along the stem are designed to provide a range of positions of the coupling portion relative to the cover over which the coupling portion will be in a position to resist separation of the barrier device from the cover, whereby the barrier device can be coupled with a cover whose thickness can vary over a predetermined range and the hood of the barrier device will combine with the cover to form a barrier to materials and objects near the border of the hood over that predetermined thickness range.

- 0079 24 A barrier device as defined in claim 12, wherein extender structure is configured to be integrally coupled to the stem, to provide an extended cap structure that can be coupled to a cover.
- 0080 25. A barrier device as defined in claim 24, wherein the extender structure comprises an extender and a locking member that can be coupled to the extender to couple the extended cap structure to a cover; the stem having a recess with a closed end and the extender comprising a strap configured to (a) pierce the closed end of the recess (b) extend through the pierced end of the recess and (c) close off the pierced end of the recess, thereby to extend the stem of the cap structure, and the locking member configured to engage the strap in a manner such that the locking member can move along the stem in a first direction for coupling the extended cap structure with a cover.
- 0081 26. A barrier device as defined in claim 25, wherein the extender structure comprises an extender and a locking member that can be coupled to the extender to couple the extended cap structure to a cover; the stem having a distal end with an opening and the extender comprising a strap configured to extend through the opening in the distal end of the recess and to close off the opening in the distal end of the recess, thereby to extend the stem of the cap structure, and the locking member configured to engage the strap in a manner such that the locking member can move along the stem in a first direction for coupling the extended cap structure with a cover.
- 0082 27. A barrier device and defined in claim 26, wherein the locking member comprises a relatively flat portion with a raised portion having a passageway configured to receive the strap and to move along the strap in the first direction, for coupling the extended cap structure with a cover.
- 0083 28. A barrier device as defined in claim 27, wherein the raised portion and strap have respective ratchet structure configured to enable the locking member to move in the first direction along the strap and resisting movement of the locking member in the opposite direction along the strap.

- 0084** 29. A barrier device as defined in claim 28, wherein the raised portion extends in one direction from the relatively flat portion, and wherein the relatively flat portion has a peripheral skirt that extends in the opposite direction from the relatively flat portion, the locking member configured such that the peripheral skirt will engage the underside of a fluid system cover when the locking member moves in the first direction along the strap.
- 0085** 30. A barrier device as defined in claim 29, wherein the raised portion, its respective ratchet structure, and the peripheral skirt are formed in one piece with the relatively flat portion